DOCUMENT RESUME

ED 396 947 SE 058 651

AUTHOR Remsberg, Judy; Buie, Wendy
TITLE Community College Successful Intervention Programs: ATOMS, RSI and Vocational Gender Equity.
PUB DATE Jun 96
NOTE 8p.; Paper presented at the WEPAN National Conference (Denver, CO, June 1-4, 1996).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Career Awareness; Demonstration Programs; *Engineering Education; Higher Education; Junior High Schools; *Mathematics Education; Middle Schools; *Science Education; *Technology Education

ABSTRACT

The Mission Statement of Thomas Nelson Community College contains the statement, "As a community-based institution, TNCC strives to be responsive to the educational and skill needs of area businesses, industries, and government agencies." This paper describes three programs initiated to support this aspect of the college mission. Adventures in Technology = Options in Math and Science and The Regional Summer Math and Science Institute promote science, math, engineering, and technology interest at the middle school level and target average achievers who frequently opt out of the higher levels of high school math and science courses. Vocational Gender Equity's initial goal was to establish and operate a regional vocational sex equity center on campus serving single parents and displaced homemakers to promote educational and career opportunities, and to inform all students of their rights to choices from the full career spectrum and to the best education possible. (MKR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
J. Remsberg
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 396 947

COMMUNITY COLLEGE SUCCESSFUL INTERVENTION PROGRAMS: ATOMS, RSI, AND VOCATIONAL GENDER EQUITY

Judy Remsberg and Wendy Buie

Thomas Nelson Community College, Hampton, Virginia

INTRODUCTION

The Mission Statement of Thomas Nelson Community College contains the statement, "As a community-based institution, TNCC strives to be responsive to the educational and skill needs of area businesses, industries, and government agencies." The following narrative describes three programs initiated to support this aspect of the college mission.

ATOMS and RSI

Adventures in Technology = Options in Math and Science (ATOMS) and *The Regional Summer Math and Science Institute* (RSI) are unique, successful programs that promote science, math, engineering, and technology interest at the middle school level. They are unique because they target the backbone of the future's workforce, the *average achievers*, who frequently opt out of the higher levels of high school math and science courses. In addition, these programs address a persistent lack of progress in mathematics and science by female and minority students. The documented increase in the students' interest in science and math after the series of ATOMS/RSI activities show that the programs are successful. More important, these students *enroll at a higher rate* in math and science courses than students who have not participated in ATOMS. *And*, ATOMS students *score higher on achievement tests* after the interventions than do their counterparts.

The ATOMS and RSI Pipeline Pre-college programs were initiated on the Virginia Peninsula in 1990 in response to a predicted shortage of workers with the skills and training necessary to meet the demands of the increasingly technical workplace of the next century. A unique collaboration of business, higher education and the public school systems on the Peninsula met to develop a program geared to the middle achiever, or "forgotten population." These high tech industries know that the future technicians are drawn from the middle third of the senior classes--not from the gifted or at-risk students. With appropriate education, these students are not only better citizens but are more employable.

BEST COPY AVAILABLE

The Pipeline Programs enjoy broad community support and exposure. Through the initiative of Thomas Nelson Community College and NASA, a loyal constituency has been created that is strengthened each year. The premier high-technology employers on the Peninsula are active partners, making available talented, young, enthusiastic employees to serve in the programs. Approximately 150 technicians, scientists, and engineers from NASA Langley Research Center, the Continuous Electron Beam Accelerator Facility (CEBAF), Siemens Automotive, Canon Virginia, Inc., Newport News Shipbuilding, and Anheuser-Busch, Inc. eagerly re-enlist each year. All five Peninsula public school systems--Newport News Public Schools, Hampton City Schools, Poquoson City Public Schools, Williamsburg-James City County Public Schools, and York County Schools--participate. New Horizons Regional Education Center, a multi-school system career and technical training center serving secondary students, joined the partnership in 1993. Teachers, guidance counselors, and administrators in 19 middle schools and six high schools support the programs at their schools. Each partner industry sends one representative to sit on the Pipeline Advisory Committee. The combined talent and commitment of these individuals and organizations create the synergy that sustains the programs.

To date over 18,000 students have participated in the Pipeline Programs. Over 150 teachers, guidance counselors, and administrators help coordinate the programs, and over 150 technicians, engineers, and scientists volunteer their time annually.

PROGRAM DETAIL

The Pipeline Pre-college programs prepare middle school students with the information they need to construct a secondary school curriculum that will better equip them for post secondary education or the workforce. The major goal of the programs is to promote a positive attitude to mathematics and science. The more positive attitudes will result in increased enrollment in math and science at the high school level. Preparedness ensures that students have opportunities to pursue high-quality technological careers.

ATOMS/RSI Program Activities

Time Frame	Activity
7th Grade, Fall ATOMS	*Interactive career awareness presentation* - students listen to stories, brainstorm in small groups specific career responsibilities, and begin to formulate their vision for their personal goals.

7th Grade, Spring ATOMS	*Industry team presentation* - students participate in hands-on activities that demonstrate real-life applications of science and technology. Students may see a laser beam at work or measure an angle for piping used in submarine construction. Team members talk about their academic preparation and encourage students to take as much math and science as possible in high school.
8th Grade, Fall ATOMS	*Site visits* - students tour the industry of the team that visited them in the preceding spring; Students may see robots moving parts to an assembly line or examine non-destructive metal testing. They meet women and men working with high-technology equipment in challenging and well-paid careers. This activity stresses the importance of teamwork, communication, and proper training.
8th Grade, Spring ATOMS	*Campus visits* - students visit facilities that offer technical training such as Thomas Nelson Community College or New Horizons Regional Education Center. While on campus they participate in several activities, such as science and technology lab presentations, math or CAD lab demonstration, and a career center presentation. The campus visit also includes a panel presentation by students in technical programs. Students receive curriculum information at each area, participate in hands-on activities, and ask questions of TNCC student guides and instructors.
Rising 9th, Summer RSI	*Summer Institute* - students participate in four weeks of intensive hands on activities designed to show applications of technology in the workplace. Students learn computer aided design, surf the internet, take part in a long distance video conference, learn about polymer chemistry by making silly putty, study fresh, marsh, and salt water ecology, apply teamwork and competition to design motorized vehicles, study the physics of motion, and investigate biological systems.

EVALUATION and RESULTS

Demographics

Demographic data for 1990 of the Virginia Peninsula show that 23.8% of the population is minority and 48.8% are female (10-14 years old). Demographic data on ATOMS students show that 50% were minority and 49% were female. Clearly the ATOMS program is successful in soliciting minorities and females.

Iowa Test

ATOMS students' math and science achievement scores from the fifth grade were near the district average. After participating in ATOMS, a t-test analysis showed that students scored significantly higher than their peers. (.95 confidence interval)

Comparison of ATOMS and General School District Scores Before and After ATOMS

ITBS scores/Grade level	ATOMS		School District	
	Math	Science	Math	Science
5th grade	134	146	132	140
10th grade	177	191	171	183

Student surveys are used to evaluate the existing ATOMS program. These are distributed immediately after each intervention. The students respond to a statement of interest in the activity using a likert-like scale ("very interesting" to "not interesting at all"). Questions on this survey include those that check on the students' increased understanding of the world of work, importance of math and science, and the need for high technology education. Teachers and counselors also complete a survey that requests their opinion of how they feel the students receive the interventions.

Representative evaluation statistics for ATOMS 7th and 8th grade components:

- Over half (62%) indicated that they had a better understanding of what is involved in high-tech careers.
- Well over one-half (66%) said that they have a better understanding of why math and science are important school subjects.
- Over one-third (37%) said that they think a high-tech career is what they want.
- Almost one-half (49%) indicated they were more likely to take higher-level math courses in high school.

Class Enrollment

Minimum science credits are usually earth science in the 9th grade followed by biology in the 10th. Students may elect not to enroll in any science course beyond this point. In the 11th grade, students who are advancing through the ATOMS/RSI Pipeline Programs should be enrolled in chemistry and either geometry, algebra II or trigonometry. When compared to all 11th graders, RSI students are significantly more likely to enroll in these courses as shown in below.

Comparison of RSI and Non-RSI 11th & 12th Grade Students Enrolled in Geometry, Algebra II, Chemistry or Higher Academic Year 1993-94

RSI Class	Geometry/Algebra II or Higher		Chemistry or Higher	
	RSI	Non-RSI	RSI	Non-RSI
11th - (1991)	87.0%	67.7%	87.0%	47.6%
12th - (1990)	78.3%	56.2%	34.8%	32.1%

Test of Science Related Attitudes (TOSRA)

The Regional Summer Institute utilizes the *Test of Science Related Attitudes* (TOSRA) that is statistically reliable and valid. Students take this test on the first and last days of the summer institute for comparison purposes. The results show a pattern of attitude change in relation to "Science career," "Scientific inquiry," and "Adoption of scientific attitudes." The survey consists of seven sets of 10 questions each relating to seven areas of science interest. The students responded to each statement using a Likert-like scale of five choices ranging from "strongly agree" to "strongly disagree."

In all gender and race categories, the attitudes were more positive after participation in the RSI program than before. There was a significant increase in the Career Interest in Science for female RSI students (+7.8%) and white RSI students (+10.1%). The minority student raw score average (38.5) on Adoption of Scientific Attitudes shows a more positive attitude than all other categories of RSI students.

Tracking

The tracking system presently on a data base at the Department of Energy agency, CEBAF, (an ATOMS partner) will be an invaluable source of evaluation. Enrollments in math and science and grade achievement will be the measures for student success. Tracking also includes standardized scores, extracurricular activities and post graduation plans.

FUNDING

A grant from NASA provided startup funds for these programs. The partner industries also have contributed to an endowment to fund the programs in the future. TNCC currently funds 50% of salaries and supply expenses. Each school system supports the programs by providing transportation to industry sites and campus visits and for the 4-week summer program. Additional support provided from the school teams consists of math and science teachers, a guidance counselor, and an administrator. These teams attend the fall orientation/training and work with the

ATOMS/RSI students through the school year.

SUMMARY

The ATOMS/RSI Pre-college programs respond to the college mission statement by preparing middle school students with information they need to construct a secondary school curriculum that will better equip them for technological training after high school. More positive attitudes toward math and science are self-affirming for the course choices needed for technological training. Higher scores on achievement tests give ATOMS students the opportunities to pursue the academic technology curricula. The 1995-96 school year will see the first ATOMS students graduate from high school and begin to enter academic training, college, and the workforce.

While acknowledging the effects of multiple intervening variables, it appears that the exposure to technology-based careers and *real-world* applications of math and science through the ATOMS program does indeed motivate students to consider those careers and to enroll in appropriate classes. Longitudinal data on student enrollment in mathematics and science will provide evidence of the long-term effect of the program.

VOCATIONAL GENDER EQUITY

The Regional Center for Vocational Gender Equity (VGE) is completing its sixth year of service to participants and to the Peninsula community. The Virginia Department of Vocational Gender Equity awarded Thomas Nelson Community College a grant that provided Carl Perkins funds for the creation of a regional vocational sex equity center on campus. The initial goal was to establish and operate a center. The primary mission is to serve the career development, referral, job training and placement needs of the target population.

The primary population served by the center is single parents and displaced homemakers living on the Virginia Peninsula--Hampton, Newport News, York/Poquoson, and Williamsburg. Many of these students live at or below poverty and lack the skills to seek employment at levels that would enhance their quality of life. The program enrolls fifty to sixty people each semester. The philosophy of the program is to promote educational and career opportunities and to inform all students of their rights to choices from the full career spectrum and to the best education possible. Expanded educational opportunities, with a focus on work force preparation contribute to the economic development of the Virginia Commonwealth. Many participants are welfare recipients who exit the welfare system because of their participation in the VGE program. In this regard the program is consistent with and supportive of the Virginia Welfare Reform Initiative.

Another goal is to provide instruction and support services for nontraditional career choices. The program at Thomas Nelson Community College is unique in the Virginia Community College System. Seventy-five percent of the participants are enrolled in nontraditional programs such as women in architecture, mechanical technology, air conditioning/refrigeration, automotive technology, electronic technology, administration of justice, and men in nursing. The remaining 25 percent may be enrolled in traditional majors.

During the six years the program has been in operation, 34 participants have graduated, approximately 15 have upgraded their skills for better employment, and ten have continued their education at a four-year college in a nontraditional career field. There are program participants on the President's Honor Roll, Dean's List, Merit List, and Phi Theta Kappa National Honor Society. This group comes from various backgrounds and a range of ages but has a common cause-- to attain a better future through education.

Through small and large group meetings, VGE offers a variety of programs, workshops, and information to its participants. Programs include career planning, parenting and lifestyle planning, exploration of the gender-role stereotyping (and its negative effects), and vocational gender equity and its advantages for men and women. Each of these components helps make the program successful.